

## SEQUENCE LISTING

- <110> TABOLINA, Ekaterina Aleksandrovna  
RYBAK, Konstantin Vyacheslavovich  
KHOURGES, Evgeni Moiseevich  
VOROSHILOVA, Elvira Borisovna  
GUSYATINER, Mikhail Markovich
- <120> METHOD FOR PRODUCING L-AMINO ACID USING BACTERIA  
BELONGING TO THE GENUS ESCHERICHIA
- <130> OP1148
- <140>  
<141> 2002- -
- <150> RU 2001103865  
<151> 2001-02-13
- <150> RU 2001104998  
<151> 2001-02-26
- <150> RU 2001104999  
<151> 2001-02-26
- <150> RU 2001117632  
<151> 2001-06-28
- <150> RU 2001117633  
<151> 2001-06-28
- <160> 16
- <170> PatentIn Ver. 2.0
- <210> 1  
<211> 26  
<212> DNA  
<213> Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 1

ggctctagaca atcgtaagc gtacac

26

&lt;210&gt; 2

&lt;211&gt; 26

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 2

ccggatccga tatagtaacg acagtg

26

&lt;210&gt; 3

&lt;211&gt; 738

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(735)

&lt;400&gt; 3

atg gaa agc cct act cca cag cct gct cct ggt tgc gcg acc ttc atg	48
Met Glu Ser Pro Thr Pro Gln Pro Ala Pro Gly Ser Ala Thr Phe Met	
1 5 10 15	
gaa gga tgc aaa gac agt tta ccg att gtt att agt tat att ccg glg	96
Glu Gly Cys Lys Asp Ser Leu Pro Ile Val Ile Ser Tyr Ile Pro Val	
20 25 30	
gcc ttt gcg ttc ggt ctg aat gcg acc cgt ctg gga ttc tct cct ctc	144
Ala Phe Ala Phe Gly Leu Asn Ala Thr Arg Leu Gly Phe Ser Pro Leu	
35 40 45	
gaa agc gtt ttt ttc tcc tgc atc att tat gca ggc gcg agc cag ttc	192
Glu Ser Val Phe Phe Ser Cys Ile Ile Tyr Ala Gly Ala Ser Gln Phe	
50 55 60	
gtc att acc gcg atg ctg gca gcc ggg agt agt ttg tgg att gct gca	240

<210> 4  
 <211> 245  
 <212> PRT  
 <213> Escherichia coli

&lt;400&gt; 4

Met Glu Ser Pro Thr Pro Gln Pro Ala Pro Gly Ser Ala Thr Phe Met  
 1 5 10 15  
 Glu Gly Cys Lys Asp Ser Leu Pro Ile Val Ile Ser Tyr Ile Pro Val  
 20 25 30  
 Ala Phe Ala Phe Gly Leu Asn Ala Thr Arg Leu Gly Phe Ser Pro Leu  
 35 40 45  
 Glu Ser Val Phe Phe Ser Cys Ile Ile Tyr Ala Gly Ala Ser Gln Phe  
 50 55 60  
 Val Ile Thr Ala Met Leu Ala Ala Gly Ser Ser Leu Trp Ile Ala Ala  
 65 70 75 80  
 Leu Thr Val Met Ala Met Asp Val Arg His Val Leu Tyr Gly Pro Ser  
 85 90 95  
 Leu Arg Ser Arg Ile Ile Gln Arg Leu Gln Lys Ser Lys Thr Ala Leu  
 100 105 110  
 Trp Ala Phe Gly Leu Thr Asp Glu Val Phe Ala Ala Thr Ala Lys  
 115 120 125  
 Leu Val Arg Asn Asn Arg Arg Trp Ser Glu Asn Trp Met Ile Gly Ile  
 130 135 140  
 Ala Phe Ser Ser Trp Ser Ser Trp Val Phe Gly Thr Val Ile Gly Ala  
 145 150 155 160  
 Phe Ser Gly Ser Gly Leu Leu Gln Gly Tyr Pro Ala Val Glu Ala Ala  
 165 170 175  
 Leu Gly Phe Met Leu Pro Ala Leu Phe Met Ser Phe Leu Leu Ala Ser  
 180 185 190  
 Phe Gln Arg Lys Gln Ser Leu Cys Val Thr Ala Ala Leu Val Gly Ala  
 195 200 205  
 Leu Ala Gly Val Thr Leu Phe Ser Ile Pro Val Ala Ile Leu Ala Gly  
 210 215 220  
 Ile Val Cys Gly Cys Leu Thr Ala Leu Ile Gln Ala Phe Trp Gln Gly  
 225 230 235 240  
 Ala Pro Asp Glu Leu  
 245

&lt;210&gt; 5

&lt;211&gt; 336

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(333)

&lt;400&gt; 5

```

atg agc tat gag gtt ctg ctg ctt ggg tta cta gtt ggc gtc ggc aat 48
Met Ser Tyr Glu Val Leu Leu Leu Gly Leu Leu Val Gly Val Ala Asn
      1              5              10              15
tat tgc ttc cgc tat ttg ccg ctg cgc ctg cgt gtc ggt aat gcc cgc 96
Tyr Cys Phe Arg Tyr Leu Pro Leu Arg Leu Arg Val Gly Asn Ala Arg
      20              25              30
cca acc aaa cgt ggc ggc gta ggt att ttg ctc gac acc att ggc atc 144
Pro Thr Lys Arg Gly Ala Val Gly Ile Leu Leu Asp Thr Ile Gly Ile
      35              40              45
gcc tcg ata tgc gct ctg ctg gtt gtc tct acc gca cca gaa gtc atg 192
Ala Ser Ile Cys Ala Leu Leu Val Val Ser Thr Ala Pro Glu Val Met
      50              55              60
cac gat aca cgc cgt ttc gtc ccc acg ctg gtc ggc ttc ggc gta ctg 240
His Asp Thr Arg Arg Phe Val Pro Thr Leu Val Gly Phe Ala Val Leu
      65              70              75              80
ggt gcc agt ttc tat aaa aca cgc agc att atc atc cca aca ctg ctt 288
Gly Ala Ser Phe Tyr Lys Thr Arg Ser Ile Ile Ile Pro Thr Leu Leu
      85              90              95
agt ggc ctg gcc tat ggg ctc gcc tgg aaa gtc atg ggc att ata taa 336
Ser Ala Leu Ala Tyr Gly Leu Ala Trp Lys Val Met Ala Ile Ile
      100              105              110

```

&lt;210&gt; 6

&lt;211&gt; 111

&lt;212&gt; PRT

&lt;213&gt; Escherichia coli

&lt;400&gt; 6

```

Met Ser Tyr Glu Val Leu Leu Leu Gly Leu Leu Val Gly Val Ala Asn
      1              5              10              15
Tyr Cys Phe Arg Tyr Leu Pro Leu Arg Leu Arg Val Gly Asn Ala Arg
      20              25              30
Pro Thr Lys Arg Gly Ala Val Gly Ile Leu Leu Asp Thr Ile Gly Ile
      35              40              45
Ala Ser Ile Cys Ala Leu Leu Val Val Ser Thr Ala Pro Glu Val Met
      50              55              60
His Asp Thr Arg Arg Phe Val Pro Thr Leu Val Gly Phe Ala Val Leu
      65              70              75              80
Gly Ala Ser Phe Tyr Lys Thr Arg Ser Ile Ile Ile Pro Thr Leu Leu

```

	85	90	95
Ser	Ala	Leu	Ala
Tyr	Gly	Leu	Ala
Trp	Lys	Val	Met
Ala	Ile	Ile	
100	105	110	

&lt;210&gt; 7

&lt;211&gt; 37

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 7

cccttgggtac cagatctgcg ggcagtgagc gcaacgc

37

&lt;210&gt; 8

&lt;211&gt; 34

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 8

ctgtttctag atcctgtgtg aaattgttat ccgc

34

&lt;210&gt; 9

&lt;211&gt; 28

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 9

ggctctagata tggctaacat tatccggc

28

&lt;210&gt; 10

&lt;211&gt; 23

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 10

ccggatccaa acggagcatg gcagctcc

28

&lt;210&gt; 11

&lt;211&gt; 648

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1).. (645)

&lt;400&gt; 11

gtg att cag acc ttt ttt gat ttt ccc gtt tac ttc aaa ttt ttc atc 48

Met Ile Gln Thr Phe Phe Asp Phe Pro Val Tyr Phe Lys Phe Phe Ile

1 5 10 15

ggg tta ttt gcg ctg gtc aac ccg gta ggg att att ccc gtc ttt atc 96

Gly Leu Phe Ala Leu Val Asn Pro Val Gly Ile Ile Pro Val Phe Ile

20 25 30

agc atg acc agt tat cag aca gcg gca gcg cga aac aaa act aac ctt 144

Ser Met Thr Ser Tyr Gln Thr Ala Ala Ala Arg Asn Lys Thr Asn Leu

35 40 45

aca gcc aac ctg tct gtg gcc att atc ttg tgg atc tcg ctt ttt ctc 192

Thr Ala Asn Leu Ser Val Ala Ile Ile Leu Trp Ile Ser Leu Phe Leu

50 55 60

ggc gac acg att cta caa ctt ttt ggt ata tca att gat tcg ttc cgt 240

Gly Asp Thr Ile Leu Gln Leu Phe Gly Ile Ser Ile Asp Ser Phe Arg

65 70 75 80

atc gcc ggg ggt atc ctg gtg gtg aca ata gcg atg tcg atg atc agc 288

Ile Ala Gly Gly Ile Leu Val Val Thr Ile Ala Met Ser Met Ile Ser

85 90 95

ggc aag ctt ggc gag gat aaa cag aac aag caa gaa aaa tca gaa acc 336

Gly Lys Leu Gly Glu Asp Lys Gln Asn Lys Gln Glu Lys Ser Glu Thr

100 105 110

gcg gta cgt gaa agc att ggt gtg gtg cca ctg gcg ttg ccg ttg atg 384

Ala Val Arg Glu Ser Ile Gly Val Val Pro Leu Ala Leu Pro Leu Met

115 120 125

gcg ggg cca ggg gcg atc agt tct acc atc gtc tgg ggt acg cgt tat 432  
 Ala Gly Pro Gly Ala Ile Ser Ser Thr Ile Val Trp Gly Thr Arg Tyr  
 130 135 140  
 cac agc att agc tat ctg ttt ggt ttc ttt gtg gct att gca ttg ttc 480  
 His Ser Ile Ser Tyr Leu Phe Gly Phe Phe Val Ala Ile Ala Leu Phe  
 145 150 155 160  
 gct tta tgt tgt tgg gga ttg ttc cgc atg gca ccg tgg ctg gta cgg 528  
 Ala Leu Cys Cys Trp Gly Leu Phe Arg Met Ala Pro Trp Leu Val Arg  
 165 170 175  
 gtt tta cgc cag acc ggc atc aac glg att acg cgt att atg ggg cta 576  
 Val Leu Arg Gln Thr Gly Ile Asn Val Ile Thr Arg Ile Met Gly Leu  
 180 185 190  
 ttg ctg atg gca ttg ggg att gaa ttt atc gtt act ggt att aag ggg 624  
 Leu Leu Met Ala Leu Gly Ile Glu Phe Ile Val Thr Gly Ile Lys Gly  
 195 200 205  
 att ttc ccc ggc ctg ctt aat taa 648  
 Ile Phe Pro Gly Leu Leu Asn  
 210 215

&lt;210&gt; 12

&lt;211&gt; 215

&lt;212&gt; PRT

&lt;213&gt; Escherichia coli

&lt;400&gt; 12

Met Ile Gln Thr Phe Phe Asp Phe Pro Val Tyr Phe Lys Phe Phe Ile  
 1 5 10 15  
 Gly Leu Phe Ala Leu Val Asn Pro Val Gly Ile Ile Pro Val Phe Ile  
 20 25 30  
 Ser Met Thr Ser Tyr Gln Thr Ala Ala Arg Asn Lys Thr Asn Leu  
 35 40 45  
 Thr Ala Asn Leu Ser Val Ala Ile Ile Leu Trp Ile Ser Leu Phe Leu  
 50 55 60  
 Gly Asp Thr Ile Leu Gln Leu Phe Gly Ile Ser Ile Asp Ser Phe Arg  
 65 70 75 80  
 Ile Ala Gly Gly Ile Leu Val Val Thr Ile Ala Met Ser Met Ile Ser  
 85 90 95  
 Gly Lys Leu Gly Glu Asp Lys Gln Asn Lys Gln Glu Lys Ser Glu Thr  
 100 105 110  
 Ala Val Arg Glu Ser Ile Gly Val Val Pro Leu Ala Leu Pro Leu Met  
 115 120 125



Ala	Gly	Pro	Gly	Ala	Ile	Ser	Ser	Thr	Ile	Val	Trp	Gly	Thr	Arg	Tyr
130						135					140				
His	Ser	Ile	Ser	Tyr	Leu	Phe	Gly	Phe	Phe	Val	Ala	Ile	Ala	Leu	Phe
145					150					155				160	
Ala	Leu	Cys	Cys	Trp	Gly	Leu	Phe	Arg	Met	Ala	Pro	Trp	Leu	Val	Arg
					165					170				175	
Val	Leu	Arg	Gln	Thr	Gly	Ile	Asn	Val	Ile	Thr	Arg	Ile	Met	Gly	Leu
					180					185				190	
Leu	Leu	Met	Ala	Leu	Gly	Ile	Glu	Phe	Ile	Val	Thr	Gly	Ile	Lys	Gly
					195					200				205	
Ile	Phe	Pro	Gly	Leu	Leu	Asn									
					210					215					

&lt;210&gt; 13

&lt;211&gt; 28

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 13

ggctctagagt ccgcggcaat tatcaggg

28

&lt;210&gt; 14

&lt;211&gt; 29

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence:primer

&lt;400&gt; 14

ccagatctgg tagttgtgac gctaccggg

29

&lt;210&gt; 15

&lt;211&gt; 594

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(591)

&lt;400&gt; 15

```

aig aat gaa atc att tct gca gca gtt tta ttg atc ctg att atg gat 48
Met Asn Glu Ile Ile Ser Ala Ala Val Leu Leu Ile Leu Ile Met Asp
      1           5           10           15
ccg ctc gga aac cta cct att ttc atg tcc gta ctg aaa cat act gaa 96
Pro Leu Gly Asn Leu Pro Ile Phe Met Ser Val Leu Lys His Thr Glu
      20           25           30
ccg aaa aga cgg cgg gca atc atg gtg cga gag ttg ctt att gct ctc 144
Pro Lys Arg Arg Arg Ala Ile Met Val Arg Glu Leu Leu Ile Ala Leu
      35           40           45
ctg gtg atg ctg gtg ttc ctg ttt gcg ggt gag aaa att ctg gca ttt 192
Leu Val Met Leu Val Phe Leu Phe Ala Gly Glu Lys Ile Leu Ala Phe
      50           55           60
ctt agc cta cga gca gaa acc gtc tcc att tct ggc ggc atc att ctg 240
Leu Ser Leu Arg Ala Glu Thr Val Ser Ile Ser Gly Gly Ile Ile Leu
      65           70           75           80
ttt ctg atc gcc att aaa atg att ttc ccc agc gct tca gga aat agc 288
Phe Leu Ile Ala Ile Lys Met Ile Phe Pro Ser Ala Ser Gly Asn Ser
      85           90           95
agc ggg ctt ccg gca ggt gaa gag cca ttt atc gtg ccg ttg gca att 336
Ser Gly Leu Pro Ala Gly Glu Glu Pro Phe Ile Val Pro Leu Ala Ile
      100          105          110
ccg tta gtc gcc ggg ccg act att ctc gcc acg ctg atg ttg tct 384
Pro Leu Val Ala Gly Pro Thr Ile Leu Ala Thr Leu Met Leu Leu Ser
      115          120          125
cat cag tac ccg aat cag atg ggg cat ctg gtg att gct ctg ctg ctg 432
His Gln Tyr Pro Asn Gln Met Gly His Leu Val Ile Ala Leu Leu Leu
      130          135          140
gcc tgg ggc ggc acc ttt gtc atc ctg cta cag tct tgg cta ttt tta 480
Ala Trp Gly Gly Thr Phe Val Ile Leu Leu Gln Ser Ser Leu Phe Leu
      145          150          155          160
cgt ctg ctg ggc gag aaa ggg gtg aac gca ctt gaa cgc ctg atg gga 528
Arg Leu Leu Gly Glu Lys Gly Val Asn Ala Leu Glu Arg Leu Met Gly
      165          170          175
ttg att ctg gtg atg atg gca acc cag atg ttc ctc gac ggc att cga 576
Leu Ile Leu Val Met Met Ala Thr Gln Met Phe Leu Asp Gly Ile Arg
      180          185          190

```

atg tgg atg aag ggg taa

594

Met Trp Met Lys Gly

195

<210> 16

<211> 197

<212> PRT

<213> Escherichia coli

<400> 16

Met Asn Glu Ile Ile Ser Ala Ala Val Leu Leu Ile Leu Ile Met Asp

1 5 10 15

Pro Leu Gly Asn Leu Pro Ile Phe Met Ser Val Leu Lys His Thr Glu

20 25 30

Pro Lys Arg Arg Arg Ala Ile Met Val Arg Glu Leu Leu Ile Ala Leu

35 40 45

Leu Val Met Leu Val Phe Leu Phe Ala Gly Glu Lys Ile Leu Ala Phe

50 55 60

Leu Ser Leu Arg Ala Glu Thr Val Ser Ile Ser Gly Gly Ile Ile Leu

65 70 75 80

Phe Leu Ile Ala Ile Lys Met Ile Phe Pro Ser Ala Ser Gly Asn Ser

85 90 95

Ser Gly Leu Pro Ala Gly Glu Glu Pro Phe Ile Val Pro Leu Ala Ile

100 105 110

Pro Leu Val Ala Gly Pro Thr Ile Leu Ala Thr Leu Met Leu Leu Ser

115 120 125

His Gln Tyr Pro Asn Gln Met Gly His Leu Val Ile Ala Leu Leu Leu

130 135 140

Ala Trp Gly Gly Thr Phe Val Ile Leu Leu Gln Ser Ser Leu Phe Leu

145 150 155 160

Arg Leu Leu Gly Glu Lys Gly Val Asn Ala Leu Glu Arg Leu Met Gly

165 170 175

Leu Ile Leu Val Met Met Ala Thr Gln Met Phe Leu Asp Gly Ile Arg

180 185 190

Met Trp Met Lys Gly

195